[0001] For exhaust subsequent treatment systems at commercial motor vehicles, which are equipped with diesel engines, the arrangement from filters is to the separation of particles, in particular from soot particles, of importance. Such filter arrangements exhibit a housing, in which between an inlet chamber and a discharge opening chamber accordingly trained, porous filter bodies well-known design are arranged. A such filter arrangement is for example from EP-B-0 236,817 in its basic structure well-known.

[0002] On the surface of the filter bodies runnings of the operation soot particle settle in, which reduces the transmissivity of the filters increased in the operating time, so that must become heated by a corresponding energy supply the accumulated soot on soot ignition temperature, which then burns down, so that the respective filter bodies again regenerated becomes. This burn-off of the soot down can taken place by means of motor measures, becomes raised with whose assistance the exhaust gas temperature on soot ignition temperature. An other possibility represents the combination with fuel additives, becomes lowered by which the soot ignition temperature. Then the soot can be burned down by energy supply with low temperatures. Further the burn-up can be self-supporting due to the oxygen surplus in the exhaust gases of a diesel engine after reaching the soot ignition temperature, so that can become again disabled after igniting the energy supply. A such arrangement to the ignition of the soot deposit is for example known from EP-B-0 286,932 in the form of Zünddrähten, which become supplied over an electric power source.

[0003] The burn-up becomes only in each case performed for a part of the entire filter surface, since becomes reduced by the soot burn in the regenerating filter member the exhaust flow in sequence thermal restriction. Thus the exhaust gas flow becomes on the other hand ensured on the not regenerating filter bodies diverted, so that is ensured to an independent soot burn-up of the regenerating filters, is that the exhaust gases become further filtered by the remaining filter bodies during operation. The burn-up of the soot deposits alone is not sufficient however, in order to manufacture the transmissivity of the filter bodies again, since with the burn-up of the soot deposits also a certain ash portion results, further the transmissivity of the filter bodies reduced.

[0004] The invention is the basis the object to create a filter assembly of the initially referred type avoided with which clogging of the filter surface becomes by ash portions.

[0005] This object becomes according to the invention dissolved by a filter assembly the deposition of particles from the exhaust gas a piston combustion engine, in particular a piston combustion engine, for example at a commercial vehicle, with an housing, in which between a lower inlet chamber and an upper outlet chamber in a flow passage at least a porous is filter body disposed, which is provided with means for releasing the burn-up by soot deposits on the filter body surface, as well as with one the inlet chamber associated ash collecting chamber, which is provided with a cover permeable for particles opposite the exhaust gas flow in the inlet chamber. By the essentially vertical arrangement of the flow passages in the filter bodies can separate in sequence of the exhaust pulsation and also in sequence of the shocks, for example by the vehicle movement on the filter surface deposited of ash portions with operating conditions with small flow velocity of the exhaust gases, fall out downward and catch in the ash collecting chamber. Since the ash collecting chamber is provided with a corresponding cover, do not know even with high flow velocities the inlet chamber flowing through exhaust gases of practical ash portions from ash-collect< DP N= 3> chamber to be whirled up and again into the inlet channels of the filter bodies be drug along. The ash portions collecting in the ash collecting chamber itself can be disposed of then in each case after periods of operation given in advance with simple means. Thereby with the time using clogging of the pore channels of the filter bodies becomes avoided, so that the exhaust counter-pressure remains also with prolonged running times, by not combustible particles, in addition, with the use from fuel additives to the improvement of the soot filter regeneration obtained. Such fuel additives serve to lower the soot ignition temperature so that achieved with a reduced energy expenditure the soot burn with an energy supply can become over the filter surface.

[0006] Since prefered at least two filter bodies become provided, in order to be able to regenerate these for a filter enterprise alternate, if the regeneration is not made during a standstill, in a favourable other embodiment of the invention to the increase of the filter surface provided that at least in each case two filter bodies in flow direction are seen one behind the other disposed and that also the second filter body means is associated for the release of the burn-up. This arrangement has the advantage that by the subdivision of the two filter bodies in modular construction in each case two of successive filter bodies provided to become to be able, which form relatively prolonged filter channels. Is by the second mechanism for releasing the burn-up nevertheless ensured is that the soot deposits are burned down on that filter passage reliable which can be regenerated in each case and in full length of the inlet channels.

[0007] In particularly advantageous embodiment of the invention at least one shaking mechanism is provided. A such shaking mechanism can become by the vehicle movement or also over a drive activated, so that additional the vehicle vibrations and amplified ash portions of the filter surface remote, deposited during

the operation, to become to be able. With use of a drivable shaking mechanism these periodic, for example also with downtimes, can become activated. Particularly favourably is it here, if the shaking mechanism is connected with the shutdown of the engine automatic, so that the still hot and dry ash remainders into the ash collecting chamber with resting atmosphere in the inlet chamber journaled to become to be able.

[0008] The term “shaking mechanism” in the scope of the invention covers each over the vehicle vibrations during the travel and/or over a drive activatable mechanism, with which into those filter body shocks introduced abzureinigenden in each case to become to be able. Such shaking mechanisms can become in each case by electromagnetic drivable vibrators, electromotive Purzelhämmer, pendulum hammer or such formed.

[0009] In advantageous embodiment of the invention is provided that the shaking mechanism becomes oscillating in each case by at least one beside by the abzureinigenden filter bodies formed the flow passage disposed, on a bearing stored hammer body formed, which fastens in the operation to the wall of the filter body. The advantage of a such shaking mechanism consists of the fact that the hammer body in the vehicle enterprise becomes offset by from the outside introduced, alternate accelerations in movement here in each case and fastens to the walls of the filter bodies which can be cleaned.

[0010] In favourable, other embodiment of the invention is provided that the hammer body with its bearing forms a shuttle valve, with which two flow passages in connection, which out-flow on a side of the Hanmerkörpers and which becomes during an oscillating motion alternate with compressed air applied, whereby a channel out-flows above the Pendelachse and a channel below the Pendelachse, so that the outgoing compressed air the hammer body alternate from the Ausmündungen moves back and forth. This arrangement is in particular favourable for commercial vehicles, which are provided with a source of compressed air for the braking system anyway, particularly. Both during the operation, especially in addition, with stopping the piston combustion engine, the shaking mechanism can become briefly driven and be made so the Abreinigung of the filter bodies by the present compressed air receiver.

[0011] The invention becomes more near explained on the basis schematic designs of an embodiment. Show:

[0012] Fig. 1 a filter assembly, partly in the section,

[0013] Fig. 2 in the detail oscillating a stored hammer body.

[0014] In Fig. 1 represented filter assembly essentially consists of an housing 1 with a lower inlet chamber 2 and an upper outlet chamber 3. The inlet chamber 2 is connected and the discharge opening chamber 3 connected by an exhaust collecting line 4,2 with a muffler mechanism by an exhaust collecting line 4,1 with a piston combustion engine. In the housing 1 5, 6 and 7 next to each other in each case porous filter bodies are 8 disposed into three fluid communications. The filter bodies 8 are for example formed as so called monoliths, which are provided with a

variety by parallel flow passages 9,1 and 9,2, whereby the flow passages are 9,1 on their the inlet chamber 2 opposite side sealed, while the flow passages are 9,2 on their the inlet chamber 2 facing side sealed. The intermediate walls 10 between the single flow passages 9,1 and 9,2 are manufactured from a porous material, for example from ceramic or metal inter, so that the gas flow incoming into the flow passages 9,1 (arrow 11) can cross 10 into the parallel flow passage longitudinal in addition 9,2 by the housing wall. In the exhaust gas stream occurring by the exhaust collecting line 4,1 contained particle, in particular soot particles, is deposited with the passage of the exhaust gases by the porous partition wall 10 on the partition wall 10. The exhaust gases flow through the intermediate wall 10 and occur only then from the flow passage 9,2 of the filter body 8 the outlet chamber 3.

[0015] Inlet-laterally an activatable mechanism 12 can be for releasing the soot burn-up provided, for example in form of a Glühdrahtes at the filter body 8. The means for releasing the soot burn-up can also be “passive” nature, D. h. in the form of catalytic acting coatings of the filter surfaces or such. Such mechanisms are known and need not more near described here to become.

[0016] The inlet chamber 2 is provided with distance over their bottom with a cover 13 in form of a sheet metal provided with holes or slits 13,1 or a temperature-solid fabric material, becomes 14 divided by which of the inlet chamber 2 an ash collecting chamber. The holes or slits 13,1 can be in relation to the current (arrows 5, 6, 7) in each case with deflection means 13,2 protected, for example in the form of by punches and deforming formed, stegförmigen deflectors, which run transverse to the flow direction. The particle particles sloping with the Abreinigen from the filter bodies 8, this are primarily ash particles, fall by the openings of the cover 13 into the ash collecting chamber 14 through and by the exhaust gas flowing into the inlet chamber 2 not again are then whirled up. The ash collecting chamber 14 is provided with here a removal device not represented more near, for example a removable box, one preferably in the bottom disposed flap or also a terminal for a suction device, so that can become remote in predeterminable time intervals the collected ash.

[0017] The arrangement of the filter bodies is now so met that during the enterprise by way of the ignition mechanism 12 Zündenergie can be supplied to a filter body in each case, so that the burn-up of the soot deposits can be accomplished here, while the other filter bodies lying in the flow paths work further than filters. In this way sequenziell a Abreinigung of the filter bodies of the individual flow paths 5, 6 and 7 can take place in the way that a flow path is regenerated in each case, while the other two flow paths filter.

[0018] By in Fig. 1 represented, modular structure can be provided with uniform filter bodies 8 by the arrangement of a corresponding number of filter bodies next to each other and one behind the other in an housing a filter assembly for the most different sizes of piston combustion engines, adapted in the size.

[0019] Between the single filter bodies 8 a here only schematic represented, drivable shaking mechanism is 15 disposed, in the operation the mutual to

adjacent filter bodies fastens and here deposited soot particles, in particular however deposited ash particles reduces.

[0020] Since with the operation of a piston combustion engine after the Dieselverfahren the soot accumulation is relatively small, it is usually sufficient that becomes 15 operated in the downtimes between the single operating times the shaking mechanism in each case, so that deposited ash parts cannot fall down by the any more not flowed through inlet chamber 2 into the ash collecting chamber 14. The arrangement can be met here in such a way that with silent seats of the piston combustion engine the automatic shaking mechanism in each case 15 for the filter altogether operated become.

[0021] In Fig. 2 is a schematic shaking mechanism 15 drivable over compressed air in form of a hammer body 17 shown stored on an axis 16 oscillating. The hammer body 17 is provided here with a blowing channel 18 led upward, in a delta 19 directed against the outer wall 8,1 of a filter body 8 out-flows.

[0022] Furthermore a second blowing channel is 20 provided, which is 16 downward guided of the axis and is with a delta 21 against the wall 8,1 of the same filter body 8 directed.

[0023] The axis 16 is here formed as shuttle valve and stands over a central bore 22 with a compressed air supply in connection.

[0024] With pressurization becomes first 8,1 away-pivoted by the air jet of the hammer bodies outgoing from the delta 19 17 with his upper end of the outer wall. Thus the valve bore connected with the blowing channel 18 closes 24 in the axis 16, while a simultaneous valve bore steps 25with the lower blowing channel 20 into connection, so that overthe compressed-air jet of the hammer bodies 17 outgoing from the delta 21 again one moves backward and at the outer wall 8,2 of the adjacent filter body 8 fastens. During this oscillating motion (arrow 23) of the hammer body 17 then the alternate upper blowing channel 18 and the lower blowing channel become 21 applied with compressed air, so that over the compressed-air jet of the hammer bodies outgoing from the delta 19 fastens 17 alternate against the wall 8,1 of the adjacent filter bodies with its bottom end.

[0025] By alternate stoppers of the hammer body 17 at the filter bodies 8 introduced become in these corresponding shocks, so that on the filter surface located particle particles, into first line ash particle with standstill of the piston combustion engine by the inlet chamber 2 into the ash collecting chamber 14 to through-fall downward to be able. With the starting up of the shaking mechanism 15 with or short after stopping the piston combustion engine the dry ash particles on the still hot filter surface only a small adhesion possess and can so light and almost complete by the filter surface remote become.